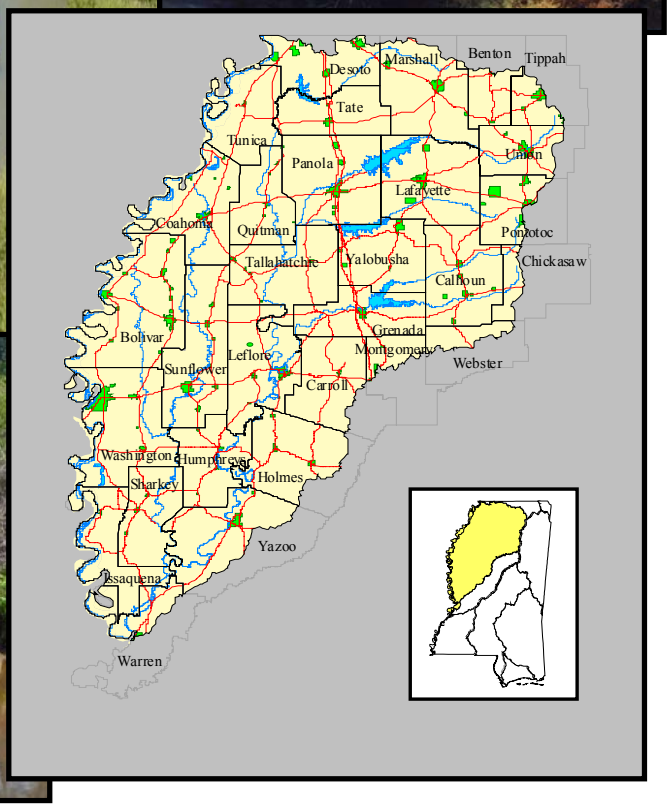
Yazoo River Basin Data Collection Plan 2001-02



FORWARD

This Yazoo River Basin Data Collection Plan represents a collaborative effort on the part of a number of state and federal agencies that address water quality issues in the Yazoo River Basin. The following state and federal agencies participated in the development of this plan:

MS Board of Levee Commissioners (Levee Board)
MS Department of Environmental Quality (MDEQ)
MS Soil & Water Conservation Commission (MSWCC)
MS Department of Wildlife, Fisheries and Parks (MWFP)
Yazoo Mississippi Delta Joint Water Management District (YMD)
US Army Corps of Engineers, Vicksburg District (USACE-Vicksburg)
US Army Corps of Engineers, Waterways Experiment Station (WES)
USDA Agricultural Research Service, National Sedimentation Lab (ARS/NSL)
USDA Forest Service (USFS)
USDA Natural Resource Conservation Service (NRCS)
US Fish and Wildlife Service (USFWS)
US Geological Survey (USGS)

Input was also provided by the Yazoo River Basin Team and from local stakeholders. Stakeholder input was accomplished through public meetings held throughout the basin, where public-generated issues were identified and comments received. Copies of this plan should be requested from the following person:

Mr. Richard Ingram
Yazoo River Basin Coordinator
Mississippi Department of Environmental Quality
P.O. Box 10385
Jackson, MS 39289-0385
tel. (601) 961-5078
fax. (601) 961-5357
e-mail Richard_Ingram@deq.state.ms.us

CONTENTS

28. Urea spills from barges could cause temporary exceedances of water quality standards – could EPA use this as an opportunity to shut down operation? The concern is that EPA might shut down an operation and adversely impact the local economy at Greenville.
29. Concern over regulation of stormwater and impact of Phase II regulations. Will towns have to establish controls for runoff from gasoline stations and other urban facilities? It is very difficult to accurately size stormwater impoundments.
30. Leaking Underground and Above Ground Storage Tanks
31. Atmospheric Deposition of Urban Pesticides
32. Determining Cumulative Impacts of Best Management Practices (BMPs) Implemented Through State and Federal Water Quality Management Plans

D. Required EPA-Delegated Issues
   1. 305(b) Water Quality Assessment Report Monitoring
   2. Development of Total Maximum Daily Loads (TMDLs) on Impaired Water Bodies
   3. Determining Condition of Section 303(d) Evaluated Waters
   4. Determining Cause of Impairment for Selected Streams
   5. Wasteload Allocation Studies on Selected Streams

LIST OF TABLES

APPENDICES

I. INTRODUCTION

A. What Is the Yazoo River Basin Data Collection Plan?

Strategic data collection is one of the core activities of Mississippi's Basinwide Approach to Water Quality Management (Basin Management Approach). Data collection in the basin planning process has four primary purposes: (1) to characterize the watershed, (2) to assess the priority issues of concern within the basin and support the development of appropriate management strategies, (3) to measure success of ongoing management activities, and (4) to involve the local stakeholders.

Within this data collection plan, priority issues of concern are identified and briefly discussed, current and planned data collection activities are identified, priority issues and data collection activities are linked, and data collection needs identified.

This plan is designed to help collaborating resource agencies maximize the efficiency of their data collection activities for the priority water quality issues in the Yazoo River Basin. These agencies were instrumental in the identification and prioritization of the issues that are the primary focus of this plan.

B. What's Inside?

After this introduction (Section I), the report is divided into two major sections. Section II identifies and discusses the priority water quality-related issues in the basin, as determined by a team of technical experts with input from the general public. These priority issues are also linked to current and planned data collection activities of state and federal agencies. Appendix A provides information about each current and planned data collection activity identified in Section II. Appendix B presents a tabular matrix of issues and related data collection activities for quick review.

C. Who Should Read this Document?

Different sections of this document will appeal to different backgrounds. Section II, which identifies and briefly discusses the priority water quality-related issues in the basin should be interesting to a broad spectrum of persons with environmental interests. The appendices of this document probably will only be of interest to water quality professionals and technical staffs of organizations and agencies with water quality-related programs.

D. How Is this Data Collection Plan Related to Other Basin Management Approach Activities?

A fundamental concept of the Basin Management Approach is for resource agency partners to maximize the efficient and effective use of their available resources by

working together to target high priority issues of mutual concern for data collection, assessment, management plan development, and implementation activities. Initially, the Yazoo River Basin Team, which primarily comprises technical personnel from twenty-five State and federal agencies active in water resource issues in the Yazoo River Basin, prepared a comprehensive list of issues of concern. About the same time, public meetings were held throughout the basin to inform the public about the Basin Management Approach and to provide a forum for the public to voice their views on issues of concern in the basin. Once identified, work groups specializing in diverse fields of study then reviewed and assessed the issues of concern and prepared comments and recommendations for the basin team. The team then reviewed the reports and recommendations of the various work groups, and comprehensively prioritized the identified issues.

E. Major Elements of Plan

Data collection planning includes two major elements: (1) the identification and compilation of existing and historic information for the purpose of establishing baseline conditions and analyzing trends, and (2) coordinating current and future data collection activities between resource agency partners to maximize efficiency of data collection. In order to achieve success with both of these elements, collaboration among resource partners is essential.

1. Identification of Current/Planned Data Collection Activities

The major focus of this data collection plan is to identify current and planned water quality monitoring activities in the Yazoo River Basin that can be used to assess the basin issues of concern that were prioritized by the Yazoo River Basin Team. Elements of this plan include: (1) descriptions of the prioritized basin issues; (2) identification of agencies and programs that collect water quality information in the basin; (3) identification of monitoring parameters, sites, collection times, data formats, and other appropriate information; and (4) linking those current/planned data collection activities to the prioritized basin issues.

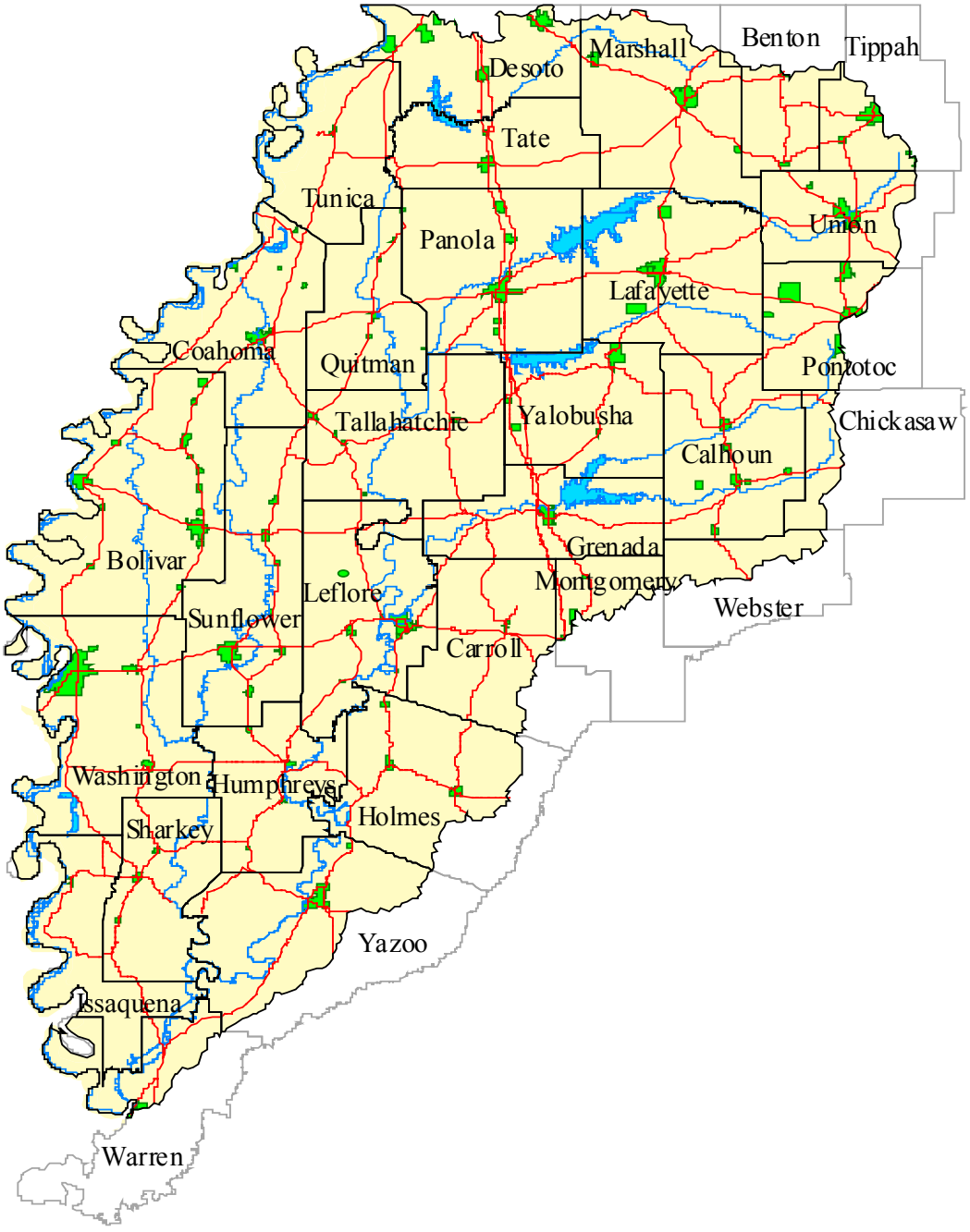
Appendix A identifies data collection activities in the Yazoo River Basin of partnering state and federal agencies. The information, in a standardized format for quick reference, includes brief explanations of why the data was collected, parameters monitored, sites monitored, monitoring intervals/dates, collection methodology used, and databases where the information is stored. Appendix B provides a comprehensive list relating these data collection activities to the prioritized basin issues.

2. Compendium of Water Quality Information

During the 1900's, significant land and hydrologic modification occurred within the Yazoo River Basin for the purposes of agricultural development and drainage improvements. To assess the impacts on the environment of these activities, a

number of state and federal agencies have collected water quality information throughout the basin for some time. This historic information is useful to establish baseline conditions and analyze trends, as well as to assess priority basin issues. To accomplish this task, a Compendium of Water Quality Information in the Yazoo River Basin is being developed contractually as a supplement to this Yazoo River Basin Data Collection Plan of current/planned data collection activities.

Index Map of the Yazoo River Basin


Benton
Tippah
Marshall
Desoto
Tate
Tunica
Panola
Union
Lafayette
Coahoma
Quitman
Ponotoc
Tallahatchie
Yalobusha
Chickasaw
Calhoun
Grenada
Bolivar
Montgomery
Leflore
Webster
Sunflower
Carroll
Washington
Humphreys
Holmes
Sharkey
Yazoo
Issaquena
Warren

II. PRIORITY BASIN ISSUES

A. High Priority Issues

Priority basin issues are identified and described briefly below. These issues are the focus of this Data Collection Plan. In several appropriate cases, medium priority issues were merged with other related high priority issues. Below the description of each issue, a table of databases that have been identified for use in the assessment of the issue is also included. A comprehensive list of the issues and related databases is provided in Appendix B.

Issue #1: Turbidity and Suspended Sediments in Streams and Oxbow Lakes

Sedimentation and turbidity are a major problem in the Yazoo River Basin. Sediments may transport contaminants and pollutants, and diminish habitat necessary for ecological health. The Bluff Hills ecoregion contains some of the most erosive soils in the world; however, sediment and turbidity problems originate in both the Delta and Bluff Hills ecoregions,

There are differences between turbidity, suspended and deposited sediments; however, the differences of these processes are closely connected. For example, disturbance of lands adjacent to stream beds can significantly increase the loading of sand, silt, and clay to stream beds. Whereas, siltation reduces beneficial uses of aquatic habitat and flow capacity of a stream, as well as increases potential impairment of downstream lakes and reservoirs.

A major consideration related to turbidity and suspended sediments in streams and oxbow lakes is the belief that stream bank and bed erosion are the major sources of total suspended solids (TSS) in streams in the Bluff Hills ecoregion. Stream bank erosion is a natural process, which may be affected by channel modification. However, channelization may have been a bigger problem in the past than it is today because of the adoption of new environmentally-friendly channelization techniques.

Seventeen databases have been identified that can be used for assessment of this issue. These databases are listed below and included in Appendix B. More information about each database is provided in Appendix A.

Agency-Office-Program	Data Collection Activities/Databases That Can Be Used for Assessment of Issue #1	Appendix Number
MDEQ-WQAB	Ambient Surface Water Quality Monitoring Program	A.1.a
MDEQ-WQAB	Development of IBI for Wadeable Streams	A.1.b
MDEQ-WQAB	Monitoring and Assessment of 303(d) Evaluated Wadeable Streams and Rivers in Yazoo River Basin	A.1.c
MDEQ-WQAB	Waste Load Allocation Studies	A.1.d
MDEQ-WQAB	Nutrient Criteria Development for Streams/Rivers and Lakes	A.1.e

MDEQ-TMDL	Yazoo River Basin Wet Weather Monitoring	A.2.c
MSWCC	Pre- and Post-Management Practice Installation Soil Loss Calculations	A.8.a
MDWFP	Fish Population Surveys of Lakes in Delta and MS River Oxbow Lakes	A.9.a
MDWFP	Surveys of Fish Populations in Flood Control Reservoirs	A.9.c
USACE-WES	Monitoring to Assess Impact of Flood Control Projects, Restoration of Aquatic Habitats, and Low-Flow Studies	A.11.a
USDA ARS-NSL	MS Evaluations Systems Areas/MSEA	A.12.a
USDA ARS-NSL	Chemical, Physical, Biological, and Habitat Monitoring	A.12.b
USFWS	Assessment of Chemical Contamination in National Wildlife Refuges in the Lower Mississippi River Ecosystem	A.13.a
USGS	Stream Gauge Monitoring	A.14.a
USGS	MS Delta Management Systems Evaluation Areas Project Monitoring	A.14.b
USGS	National Water Quality Assessment Project	A.14.c
USGS	Deer Creek Flow and Water Quality Monitoring	A.14.f

Issue #2: Habitat Loss

Habitat loss is a very complicated issue and a major concern in the Yazoo River Basin. To better address this issue, five categories and effects have been identified and are discussed below:

Ecoregional-Characterisitic Processes and Effects

Bluff Hills ecoregion:

Incision, bank erosion, and channel erosion are the processes that create primary habitat problems. These processes increase levels of turbidity and deposited sediments in streams and lakes, directly impacting habitat and aquatic life.

Delta ecoregion:

Bank erosion, lack of channel structure, reduced connectivity to backwater areas, and agricultural runoff are the processes that create the primary habitat problems.

Loss of Riparian Habitat, Including Wetlands

Loss of riparian habitat is a basinwide problem that affects wetlands directly, as well as water quality in water bodies adjacent to wetland areas.

Habitat Loss Due To Low Flow Conditions

Habitat is diminished or eliminated when water levels are decreased.

Reservoirs at Arkabutla and Grenada

Elevated levels of sediment and turbidity are impacting the aquatic habitat in Arkabutla and Grenada Reservoirs.

Oxbow Lakes

Sedimentation quickly converts oxbow aquatic habitats to terrestrial habitat. The practice usually undertaken to compensate for the habitat loss is to construct weirs on outlets to the lake that artificially raise the lake's water level. However, in many instances water levels are raised beyond historical levels and questionable long-term benefits are derived.

Information that will help to determine ambient arsenic levels in soil, water, sediment, fish tissue, and the atmospheric are needed, as are ambient levels of total and dissolved aluminum in surface water and aluminum in fish tissue.

Seventeen databases have been identified that can be used for assessment of this issue. These databases are listed below and included in Appendix B. More information about each database is provided in Appendix A.

Agency-Office-Program	**Data Collection Activities/Databases That Can Be Used for Assessment of Issue #2**	**Appendix Number**
MDEQ-WQAB	Ambient Surface Water Quality Monitoring Program	A.1.a
MDEQ-WQAB	Development of IBI for Wadeable Streams	A.1.b
MDEQ-WQAB	Monitoring and Assessment of 303(d) Evaluated Wadeable Streams and Rivers in Yazoo River Basin	A.1.c
MDEQ-WQAB	Waste Load Allocation Studies	A.1.d
MDEQ-WQAB	Nutrient Criteria Development for Streams/Rivers and Lakes	A.1.e
MDEQ-TMDL	Low-Level Infrared Aerial Photography in Selected Watersheds	A.2.h
MDWFP	Fish Population Surveys of Lakes in Delta and MS River Oxbow Lakes	A.9.a
MDWFP	Surveys of Channel Catfish Populations in MS	A.9.b
MDWFP	Surveys of Fish Populations in Flood Control Reservoirs	A.9.c
USACE-WES	Monitoring to Assess Impact of Flood Control Projects, Restoration of Aquatic Habitats, and Low-Flow Studies	A.11.a
USDA ARS-NSL	MS Evaluations Systems Areas/MSEA	A.12.a
USDA ARS-NSL	Chemical, Physical, Biological, and Habitat Monitoring	A.12.b
USFWS	Assessment of Chemical Contamination in National Wildlife Refuges in the Lower Mississippi River Ecosystem	A.13.a
USGS	Stream Gauge Monitoring	A.14.a

USGS	MS Delta Management Systems Evaluation Areas Project Monitoring	A.14.b
USGS	National Water Quality Assessment Project	A.14.c
USGS	Deer Creek Flow and Water Quality Monitoring	A.14.f

Issue #3: Effective Drainage From Agricultural Lands

An important consideration for production agriculture is the adequate drainage of excess surface water from fields. However, management practices designed to establish effective drainage from agricultural fields varies according to the crop and contaminants present. Current research seeks to document the locations of installed best management practices (BMPs). USDA ARS/NSL and Arkansas State University are studying the pesticide mitigation capabilities of agricultural drainage ditches. Data from this study will be available when it is completed.

Fifteen databases have been identified that can be used for assessment of this issue. These databases are listed below and included in Appendix B. More information about each database is provided in Appendix A.

Agency-Office-Program	Data Collection Activities/Databases That Can Be Used for Assessment of Issue #3	Appendix Number
MDEQ-WQAB	Ambient Surface Water Quality Monitoring Program	A.1.a
MDEQ-WQAB	Development of IBI for Wadeable Streams	A.1.b
MDEQ-WQAB	Monitoring and Assessment of 303(d) Evaluated Wadeable Streams and Rivers in Yazoo River Basin	A.1.c
MDEQ-WQAB	Waste Load Allocation Studies	A.1.d
MDEQ-WQAB	Nutrient Criteria Development for Streams/Rivers and Lakes	A.1.e
MDEQ-TMDL	Low-Level Infrared Aerial Photography in Selected Watersheds	A.2.h
MDEQ-GWPB	Agricultural Chemical Groundwater Monitoring Program	A.3.a
USACE-WES	Monitoring to Assess Impact of Flood Control Projects, Restoration of Aquatic Habitats, and Low-Flow Studies	A.11.a
USDA ARS-NSL	MS Evaluations Systems Areas/MSEA	A.12.a
USDA ARS-NSL	Chemical, Physical, Biological, and Habitat Monitoring	A.12.b
USFWS	Assessment of Chemical Contamination in National Wildlife Refuges in the Lower Mississippi River Ecosystem	A.13.a
USGS	Stream Gauge Monitoring	A.14.a
USGS	MS Delta Management Systems Evaluation Areas Project Monitoring	A.14.b
USGS	National Water Quality Assessment Project	A.14.c
USGS	Deer Creek Flow and Water Quality Monitoring	A.14.f

Issue #4: Effects of Low Base Flows

During recent droughts, the effects of low base flows have become a serious environmental and economic concern in the basin. The effects are associated with the following three categories: (1) loss of base flows of major Delta streams, especially the Sunflower River; (2) water quality-related effects (aquatic life/habitat); and (3) protection of water supplies in the alluvial aquifer (aquifer overdrafts).

Loss of Base Flows of Major Delta Streams, Especially the Sunflower River

Base flows in major Delta streams (e.g. Sunflower River, Bogue Phalia, and Quiver River) have historically been maintained by recharge from the Mississippi River Alluvial Aquifer during periods of limited rainfall. However, agricultural water use expanded quickly after 1970 with the introduction of rice, catfish and row crop irrigation. Since that time, river stages and flow have gradually declined as a result of aquifer levels dropping below the bottoms of many major river and stream channels.

A stage recorder has been located on the Sunflower River at the Town of Sunflower for several decades. Prior to 1970, the lowest flows recorded during dry fall months were about 100 to 120 cubic feet per second (cfs). However, during the mid 1990's Fall seasonal flows at this site were documented at just under 10 cfs.

Water Quality-Related Effects (Aquatic Life/Habitat)

A study of water quality and fisheries conditions during low flow conditions was conducted during October 1997 through a multi-agency data collection effort. The study did not reveal any exceedances of dissolved oxygen levels at very low flow conditions. Fisheries data collected at that time is available at USACE – Waterways Experiment Station.

Protection of Water Supplies in the Alluvial Aquifer (Aquifer Overdrafts)

YMD and Soil and Water Conservation Districts in the Delta sponsored an NRCS study that evaluated ways to develop new water supplies to be used to maintain Sunflower River flows. That work has completed the feasibility phase and is continuing into a more detailed design and eventual implementation phase.

Fifteen databases have been identified that can be used for assessment of this issue. These databases are listed below and included in Appendix B. More information about each database is provided in Appendix A.

Agency-Office-Program	Data Collection Activities/Databases That Can Be Used for Assessment of Issue #4	Appendix Number
MDEQ-WQAB	Ambient Surface Water Quality Monitoring Program	A.1.a
MDEQ-WQAB	Waste Load Allocation Studies	A.1.d
MDEQ-OLWR	Geohydrologic Connection Study of Interaction between MRVA and Tertiary Aquifers Along Bluff Hills	A.6.a
MDEQ-OLWR	Potentiometric Mapping of MRVA Based Upon Water Level Data 1980-94	A.6.b
MDEQ-OLWR	Water Use Information Collection	A.6.d
MDEQ-OLWR	Cockfield Aquifer Monitoring	A.6.f
MDEQ-OLWR	Measuring Low-Flows on Sunflower River from Clarksdale to Highway 82	A.6.g
MDEQ-OLWR	Monitoring Deep Aquifer Water Levels	A.6.h
MBLC	Water Level Monitoring During High Water Events	A.7.a
MDWFP	Surveys of Channel Catfish Populations in MS	A.9.b
USACE-WES	Monitoring to Assess Impact of Flood Control Projects, Restoration of Aquatic Habitats, and Low-Flow Studies	A.11.a
USDA ARS-NSL	Chemical, Physical, Biological, and Habitat Monitoring	A.12.b
USGS	Stream Gauge Monitoring	A.14.a
USGS	Assessment of MRVA Aquifer Unsaturated Zone	A.14.d
USGS	Continuous Water Level Measurements	A.14.e

Issue #5: Erosion, Sediment Control, Nutrient, Pesticide, and Storm Water Management for Rapidly Growing Urban Areas, Including Recently Constructed Highways

National studies have shown that increasing the amount of impervious surface, without implementing erosion, sediment, and storm water controls, causes a corresponding decline in water quality and is particularly damaging to aquatic life and habitat. Urban areas have been rapidly growing since 1992 with no signs of slowing; however, very little local data exists to document the problem and motivate local officials and the public to implement erosion, sediment, and permanent storm water controls.

The only known existing data sources for this issue are the complaints database of the MDEQ Environmental Compliance and Enforcement Division, the Center for Watershed Protection, and some local governments. Areas where rapid urban growth has taken place and where it is likely to take place in the near future should be identified for the collection of flow data, projected runoff amounts, and a study of contaminants in the runoff.

Seven databases have been identified that can be used for assessment of this issue. These databases are listed below and included in Appendix A. More information about each database is provided in Appendix A.

Agency-Office-Program	Data Collection Activities/Databases That Can Be Used for Assessment of Issue #5	Appendix Number
MDEQ-WQAB	Ambient Surface Water Quality Monitoring Program	A.1.a
MDEQ-WQAB	Development of IBI for Wadeable Streams	A.1.b
MDEQ-WQAB	Monitoring and Assessment of 303(d) Evaluated Wadeable Streams and Rivers in Yazoo River Basin	A.1.c
MDEQ-WQAB	Waste Load Allocation Studies	A.1.d
MDEQ-WQAB	Nutrient Criteria Development for Streams/Rivers and Lakes	A.1.e
MDEQ-TMDL	Yazoo River Basin Wet Weather Monitoring	A.2.c
USDA ARS-NSL	Chemical, Physical, Biological, and Habitat Monitoring	A.12.b

Issue #6: Pesticides

Without question, the most publicized environmental issue existing today in the Delta ecoregion is the occurrence of elevated levels of DDT and Toxaphene in large bottom-dwelling fish. Recently, MDEQ in conjunction with MSDH and MDWFP (Fish Advisory Task Force) issued a fish advisory for most of the Delta. In the advisory, consumption of no more than two mals per month of buffalo, carp and gar and two meals per month of catfish larger than 22 inches was advised. Additionally, the public was advised not to consume any size of buffalo fish from Roebuck Lake.

For years, MDEQ has monitored fish tissue across the state. These studies were the basis for the Fish Advisory Task Force to adopt advisories for specific contaminants such as dioxin, polychlorinated biphenyls (PCBs), and mercury in specific areas within the state.
Historically, monitoring information revealed that the highest DDT and Toxaphene levels in the state were found in the Delta ecoregion where the use of these chemicals was most prevalent.

DDT and Toxaphene contamination are not an issue for more than two-thirds of the state and for Delta lakes located west of the Mississippi River levee, where fish were found to be free of elevated levels of those contaminants. This area was not covered by the advisory and includes the following lakes: Horn, Tunica, DeSoto, Beulah, Whittington, Ferguson, Lee, Albermarle and Chotard, which are widely used for recreation and fishing. Farm-raised catfish were also shown to be free of the contaminants.

In order to effectively address the issue of pesticides, the issue was divided into the following three sub-categories: (1) current use pesticides, (2) residual effects from banned pesticides, and (3) public perceptions.

Current Use Pesticides

Today's pesticides are chemically and environmentally different from organochlorine insecticides of the post-World War II era. Most of today's pesticides have environmental half-lives of days or weeks, rather than the decades-long half-lives of early organochlorines. The competitive market for pesticides encourages production of more "natural" and "environmentally friendly" pesticides. In essence, the effects of early pesticides are much different and require a different management approach than those being currently used in agricultural production.

Residual Effects from Banned Pesticides

It is important to note that DDT use in the U.S. has been banned since the early 1970s. The occurrences of DDT and its metabolites found during recent monitoring activities are actually degraded metabolites of the parent compound applied more than 25 years ago.

Public Perceptions

The occurrence of a pesticide in a surface or ground water sample is often a "hot button" issue to the public, regardless of the concentration of the contaminant. The public needs to become better educated about the facts and impacts of pesticide usage, from both a current use and historic perspective.

Because of the potential for human health risks, pesticide monitoring is a priority of many resource agencies. More information is needed to monitor the occurrence and potential threat of pesticides to our waters.

Thirteen databases have been identified that can be used for assessment of this issue. These databases are listed below and included in Appendix B. More information about each database is provided in Appendix A.

Agency-Office-Program	Data Collection Activities/Databases That Can Be Used for Assessment of Issue #6	Appendix Number
MDEQ-WQAB	Ambient Surface Water Quality Monitoring Program	A.1.a
MDEQ-WQAB	Development of IBI for Wadeable Streams	A.1.b
MDEQ-WQAB	Monitoring and Assessment of 303(d) Evaluated Wadeable Streams and Rivers in Yazoo River Basin	A.1.c
MDEQ-TMDL	GPS Siting of Large Quantity Agricultural Chemical Storage and Mixing Sites	A.2.g
MDEQ-GWPB	Agricultural Chemical Groundwater Monitoring Program	A.3.a
MDEQ-OLWR	MRVA Infiltration Study	A.6.c
MSWCC	Pre- and Post-Management Practice Installation Soil Loss Calculations	A.8.a
USDA ARS-NSL	MS Evaluations Systems Areas/MSEA	A.12.a
USDA ARS-NSL	Chemical, Physical, Biological, and Habitat Monitoring	A.12.b

USFWS	Assessment of Chemical Contaminants in National Wildlife Refuges in the Lower MS River Ecosystem	A.13.a
USGS	Stream Gauge Monitoring	A.14.a
USGS	MS Delta Management Systems Evaluation Areas Project Monitoring	A.14.b
USGS	National Water Quality Assessment Project	A.14.c

Issue #7: Nutrients

Elevated levels of nutrients can cause excessive growth of aquatic plant communities, such as algae. Excessive growth of these plants can deplete the dissolved oxygen in surface water that is necessary for the healthy growth of life and cause eutrophication. Because of this, in many cases elevated levels of nutrients could be the driving force behind low dissolved oxygen problems in surface waters.

Limited basin-specific knowledge about seasonal nutrient effects exists. The Mississippi Nutrient Task Force, established to develop nutrient criteria for the state, is identifying gaps in water quality and sediment data sets for this issue.

When considering the nutrient issue, irrigation return flow or runoff needs to be assessed for nutrient and chemical loading before it leaves a field. Base-line data from fields is needed to determine land contributions to surface water pollution, especially when irrigation return flow or runoff significantly contributes to the base flow of a stream.

Seventeen databases have been identified that can be used for assessment of this issue. These databases are listed below and included in Appendix B. More information about each database is provided in Appendix A.

Agency-Office-Program	Data Collection Activities/Databases That Can Be Used for Assessment of Issue #7	Appendix Number
MDEQ-WQAB	Ambient Surface Water Quality Monitoring Program	A.1.a
MDEQ-WQAB	Development of IBI for Wadeable Streams	A.1.b
MDEQ-WQAB	Monitoring and Assessment of 303(d) Evaluated Wadeable Streams and Rivers in Yazoo River Basin	A.1.c
MDEQ-WQAB	Waste Load Allocation Studies	A.1.d
MDEQ-WQAB	Nutrient Criteria Development for Streams/Rivers and Lakes	A.1.e
MDEQ-TMDL	Yazoo River Basin Wet Weather Monitoring	A.2.c
MDEQ-TMDL	GPS Siting of Onsite Wastewater Dischargers in Selected Watersheds	A.2.e
MDEQ-TMDL	GPS Siting of Large Quantity Agricultural Chemical Storage and Mixing Sites	A.2.f
MDEQ-TMDL	Low-Level Infrared Aerial Photography in Selected Watersheds	A.2.h
MDEQ-GWPB	Agricultural Chemical Groundwater Monitoring Program	A.3.a

MSWCC	Pre- and Post-Management Practice Installation Soil Loss Calculations	A.8.a
USDA ARS-NSL	MS Evaluations Systems Areas/MSEA	A.12.a
USDA ARS-NSL	Chemical, Physical, Biological, and Habitat Monitoring	A.12.b
USGS	Stream Gauge Monitoring	A.14.a
USGS	MS Delta Management Systems Evaluation Areas Project Monitoring	A.14.b
USGS	National Water Quality Assessment Project	A.14.c
USGS	Deer Creek Flow and Water Quality Monitoring	A.14.f

B. Medium Priority Issues

Medium priority issues are described briefly in this section. In appropriate cases, several medium priority issues were incorporated into other related medium priority issues.

Issue #8: Effects of Agricultural and Mining Drainage onto Public Lands

Agricultural row crop production and sand and gravel mining activities occur adjacent to four national wildlife refuges (NWRs) in the Delta ecoregion and the Delta National Forest. Streams entering these public lands are being adversely impacted by agricultural runoff and mining drainage. During rainfall events, soil is washed from the agricultural land into the streams. Compounding this occurrence, adjacent gravel mining also causes sediment to be deposited into many of these streams. According to the United States Geological Survey (USGS), sediment deposition rates are high on the refuge. Increased levels of sediment usually result in elevated turbidity levels, loss of aquatic habitat, and timber kills on the refuge. The sediment also has organochlorine pesticides adsorbed onto it, and sediment that is deposited by streams in a refuge, fish and wildlife are contaminated with the organochlorine pesticides while foraging in the sediment or ingesting contaminated food items.

Table 1
Public Lands Impacted By Agricultural Runoff and Mining Drainage

Public Land	County	Waterbody	Source of Problem
Hillside NWR	Holmes	Fannegusha Creek	Erosion and sediment runoff from agricultural lands
			Gravel mining drainage
		Black Creek	Erosion and sediment runoff from agricultural lands
			Gravel mining drainage
Mathews Brake NWR	Leflore	Abiaca Creek	Erosion and sediment runoff from agricultural lands
			Gravel mining drainage

Morgan Brake NWR	Holmes	Millstone Bayou	Erosion and sediment runoff from agricultural lands
			Gravel mining drainage
		Chicopa Creek	Erosion and sediment runoff from agricultural lands
			Gravel mining drainage
Yazoo NWR	Yazoo	Granicus Bayou	Turbidity and elevated levels of DDT and metabolites
		Main Canal	Turbidity and elevated levels of DDT and metabolites
		Black Bayou	Turbidity and elevated levels of DDT and metabolites

USGS has collected sediment data at these sites since 1987. North Carolina State University recently assessed potential contaminant sources at 24 National Wildlife Refuges in the nation, which included the Hillside National Wildlife Refuge. The study indicated sediment and fish on the refuge are contaminated with DDT and its metabolites.

Organochlorine pesticides, metals, and hormone (testosterone, estrogen, vitellogenin) levels in fish and wildlife should be monitored. In addition, water quality data, such as ammonia, suspended solids, dissolved oxygen, biochemical oxygen demand, pH, and turbidity should be collected on each stream entering a refuge. A biological assessment should also be performed on each of these streams.

Four databases have been identified that can be used for assessment of this issue. These databases are listed below and included in Appendix B. More information about each database is provided in Appendix A.

Agency-Office-Program	Data Collection Activities/Databases That Can Be Used for Assessment of Issue #8	Appendix Number
MDEQ-TMDL	Yazoo River Basin Wet Weather Monitoring	A.2.c
USACE-WES	Monitoring to Assess Impact of Flood Control Projects, Restoration of Aquatic Habitats, and Low-Flow Studies	A.11.a
USDA ARS-NSL	Chemical, Physical, Biological, and Habitat Monitoring	A.12.b
USGS	Stream Gauge Monitoring	A.14.a

Issue #9: Low Flow on Mississippi River Oxbow Lakes

Channel modification to the Mississippi River has forced the river to cut a deeper and more hydraulically efficient channel. Because of this, the river is at flood stage a lesser amount of time now than in the past, and the duration of the river's hydraulic connection with oxbow lakes has been reduced. This has resulted in oxbow lakes reaching low water levels earlier each season and more often than in the past.

Some fisheries, water quality, and sedimentation data used to evaluate restoration projects are based on conjecture and short-term data collection and more information is needed. In addition, ecological principals associated with fish production in oxbow lakes are not well defined, and some theories concerning ecology of oxbow lakes are in dispute. Because of this, more information is also needed. Available sources of information for this issue are listed below:

1. USACOE, 1996, Project Modification Report with Environmental Assessment Lake Whittington Weir, Ms. & Ark.. USACOE Vicksburg District
2. USACOE, 199? *Similar report as above for project modification to Tunica Cutoff*. USACOE Memphis District
3. Lucas, Garry. 1992. Survey of the fishery resources of the oxbow lakes of the Mississippi River, 1987 to 1991. Freshwater Fisheries Report #109. Ms. Dept. Wildlife Fisheries & Parks, Jackson, Ms.

Six databases have been identified that can be used for assessment of this issue. These databases are listed below and included in Appendix B. More information about each database is provided in Appendix A.

Agency-Office-Program	Data Collection Activities/Databases That Can Be Used for Assessment of Issue #9	Appendix Number
MDEQ-WQAB	Ambient Surface Water Quality Monitoring Program	A.1.a
MDEQ-WQAB	Nutrient Criteria Development for Streams/Rivers and Lakes	A.1.e
MDWFP	Fish Population Surveys of Lakes in Delta and MS River Oxbow Lakes	A.9.a
USACE-WES	Monitoring to Assess Impact of Flood Control Projects, Restoration of Aquatic Habitats, and Low-Flow Studies	A.11.a
USDA ARS-NSL	MS Evaluations Systems Areas/MSEA	A.12.a
USGS	MS Delta Management Systems Evaluation Areas Project Monitoring	A.14.b

Issue #10: Effects of Channelization

Flooding in the Delta ecoregion has long been one of the challenges associated with economic development of the region. To address the issue of flooding, active drainage and channelization programs have been in existence for decades. Initially, these programs did not always consider environmental effects, such as habitat loss. However, over the past twenty years, environmental awareness has resulted in the development of new practices and procedures incorporated into drainage and channelization projects that have significantly decreased the environmental impacts of those projects in the watersheds where they have been constructed.

Residual effects from some of these early projects is the primary focus of this issue. Because this issue must be considered when considering other related issues (e.g.,

turbidity and suspended sediments in streams and oxbow lakes, habitat loss, et. al), it will not be addressed as a separate issue for information collection purposes.

Eight databases have been identified that can be used for assessment of this issue. These databases are listed below and included in Appendix B. More information about each database is provided in Appendix A.

Agency-Office-Program	Data Collection Activities/Databases That Can Be Used for Assessment of Issue #10	Appendix Number
MDEQ-WQAB	Ambient Surface Water Quality Monitoring Program	A.1.a
MDEQ-WQAB	Development of IBI for Wadeable Streams	A.1.b
MDEQ-WQAB	Monitoring and Assessment of 303(d) Evaluated Wadeable Streams and Rivers in Yazoo River Basin	A.1.c
MDEQ-WQAB	Nutrient Criteria Development for Streams/Rivers and Lakes	A.1.e
USACE-WES	Monitoring to Assess Impact of Flood Control Projects, Restoration of Aquatic Habitats, and Low-Flow Studies	A.11.a
USDA ARS-NSL	Chemical, Physical, Biological, and Habitat Monitoring	A.12.b
USGS	Stream Gauge Monitoring	A.14.a
USGS	National Water Quality Assessment Project	A.14.c

Issue #11: Unsewered Communities and Failing Septic Systems

Unsewered Communities

In the Yazoo River Basin, as in the rest of the state, a number of communities do not have centralized waste water collection and treatment facilities. Untreated sewage presents public health problems and often causes contamination of groundwater and surface waters.

Sewered communities also have needs. Many waste water facilities in the state have collection systems that need rehabilitation to prevent overflows and bypasses, and need to be upgraded to meet NPDES permit limitations. Since 1990, the State Revolving Loan Fund Program (SRF) administered by MDEQ has been providing low interest loans to eligible applicants to address waste water problems.

Information to assess scale of this issue was collected from a needs survey database created by EPA, and last updated by the state in 1996. The survey contains information such as community name, information on treatment, information on collection, permit limits, community waste water needs (if any), and other information.

Failing Septic Systems and Untreated Sewage Discharges

Another state-wide issue that also exists in the Yazoo River Basin are failing septic systems. Often this situation is caused by inadequate maintenance. Even though it is

illegal to discharge septic wastes directly into a stream, direct discharges of wastes are considered to be widespread in rural areas. This problem could be a major factor in excessive levels of nutrients being found in rivers, streams, and lakes and its impact on nitrogen, phosphorus, and potassium need to be assessed.

The only information known to exist to quantify the scale of this problem, in terms of the numbers and locations of these sites, resides in hard copy files within each county's MSDH office. Physical/chemical data needed to assess this issue include base line information related to inflow for area lakes, water quality in the lakes, and outflow data. The data needed would be typical effluent discharge data that would be expected from a treatment facility.

Five databases have been identified that can be used for assessment of this issue. These databases are listed below and included in Appendix B. More information about each database is provided in Appendix A.

Agency-Office-Program	Data Collection Activities/Databases That Can Be Used for Assessment of Issue #11	Appendix Number
MDEQ-TMDL	GPS Siting of Onsite Wastewater Dischargers	A.2.d
MDEQ-TMDL	Fecal Coliform 303(d) Monitoring and Assessment in Yazoo River Basin	A.2.a
MDEQ-TMDL	Fecal Coliform Monitoring for the Big Sunflower River Near Clarksdale	A.2.b
MDEQ-TMDL	GPS Siting of Onsite Wastewater Dischargers in Selected Watersheds	A.2.e
MDEQ-TMDL	Low-Level Infrared Aerial Photography in Selected Watersheds	A.2.f

Issue #12: Illegal Dumping and Trash Into Storm Drains

The issue of illegal solid waste dumps in rural Mississippi is a problem state-wide. Although there is little supporting data, it appears to be a greater problem in the poorer counties of the state. Since the Yazoo River Basin has a large number of economically depressed counties, the problem may be greater here than in \other basins.

Stream channels are popular targets for illegal dumpers. During rains and periods of rising waters, wastes are often transported downstream. Other dumps are located along back roads and secluded property. The impact of these dumps, from a water quality perspective, has never been documented. However, much of the public perceives that a serious problem exists where this dumping occurs. Additionally, the aesthetics issue with the public is obvious. Deer Creek has been specifically identified by basin stakeholders as a waterbody impacted by illegal dumping. Low level aerial photography has been flown which needs to be processed and interpreted to identify the locations of the illegal dump sites along Deer Creek.

Numerous documented complaints of illegal dumps in the Yazoo River Basin are on file in the records of the MDEQ Solid Waste Program. In order to aid in education and enforcement efforts, information identifying the number and location of illegal dumps would be helpful.

MDEQ manages the Local Governments Solid Waste Assistance Trust Fund (SWATF) which was created for the purpose of providing monetary resources to local counties, cities, and multi-county entities. Eligible activities include the establishment of local white goods collection sites, clean up of existing illegal dump sites, hiring of local solid waste enforcement personnel, development and promotion of education and public awareness opportunities, and for any other activities associated with the prevention, enforcement, or abatement of illegal dumps. In some cases, assessment activities might be eligible for SWAG funds.

One database has been identified that can be used for assessment of this issue. This database is listed below and included in Appendix B. More information about this database is provided in Appendix A.

Agency-Office-Program	Data Collection Activities/Databases That Can Be Used for Assessment of Issue #12	Appendix Number
MDEQ-TMDL	Low-Level Infrared Aerial Photography in Selected Watersheds	A.2.f

Issue #13: Moon Lake Watershed Restoration and Rehabilitation

The terms watershed *restoration* and *rehabilitation* are often used interchangeably. However, because of this the terms are often misunderstood and misapplied. The difference between the two terms is generally one of scale. Rehabilitation usually refers to local or site-specific areas; whereas, restoration usually indicates more of a complex process, broader in scope. Several studies have been completed on Moon Lake over the last several decades that could provide valuable information for a proposed restoration and rehabilitation project. Revitalization of miles of wetlands that filter water entering Moon Lake through Phillips Bayou should be considered as an important component of any future project. Additionally, a local stakeholder association is already in existence to provide local support, in the event that a restoration and rehabilitation project is developed.

Four databases have been identified that can be used for assessment of this issue. These databases are listed below and included in Appendix B. More information about each database is provided in Appendix A.

Agency-Office-Program	Data Collection Activities/Databases That Can Be Used for Assessment of Issue #13	Appendix Number
MDEQ-WQAB	Nutrient Criteria Development for Streams/Rivers and Lakes	A.1.e
MDEQ-TMDL	GPS Siting of Onsite Wastewater Dischargers	A.2.d
MDEQ-TMDL	Low-Level Infrared Aerial Photography in Selected Watersheds	A.2.f
USACE-WES-FS	Monitoring to Assess Impact of Flood Control Projects, Restoration of Aquatic Habitats, and Low-Flow Studies	A.11.a

Issue #14: Impacts of Trace Metals

Mercury Advisory for Enid Reservoir and Yocona River

A fish consumption advisory is in effect for largemouth bass and catfish larger than 27 inches on Enid Reservoir and the Yocona River. The advisory is one of seven mercury advisories in the state, and is part of a larger national and/or global mercury problem. The source of the contamination is not known conclusively; however, the consensus among some scientists is that mercury is ubiquitous in the environment due to a combination of naturally occurring mercury, old industrial sources, and atmospheric deposition. The mercury doesn't become a problem in fish tissue until certain water or sediment quality conditions exist which are favorable to the methylation of mercury. Once the mercury is converted to methyl mercury, which is the most bioavailable and toxic form, it moves readily through the food chain and accumulates in the muscle tissue of the larger predator species such as largemouth bass. MDEQ has several years of fish tissue data dating back to 1995, and is currently spending $50,000 - $75,000 per year statewide for fish tissue monitoring of mercury. The analyzed data is contained in Lotus spreadsheets located at the MDEQ Lab.

Mercury Advisory for Grenada Lake and Yalobusha River

Elevated levels of mercury recently have been found in Grenada Lake and the Yalobusha River, affecting largemouth and spotted bass and catfish larger than 27 inches. Because of this, a fish consumption advisory has been issued for women of childbearing age and children under seven years old to not eat more than one meal of bass or large catfish from these waters every two months. Everyone else is advised to limit consumption to no more than one meal every two weeks. This advisory extends from Highway 9 on the upper end of Grenada Lake downstream to Highway 8 near Holcomb. It includes the entire lake and the tailwaters below the dam.

Because of the potential human health effects of trace metals, continued fish tissue monitoring is needed to determine trends, and identify other species and size ranges that may be affected. Additional monitoring of sediments, rainfall and air deposition is also needed to identify the sources of contamination.

Eight databases have been identified that can be used for assessment of this issue. These databases are listed below and included in Appendix B. More information about each database is provided in Appendix A.

Agency-Office-Program	Data Collection Activities/Databases That Can Be Used for Assessment of Issue #14	Appendix Number
MDEQ-WQAB	Ambient Surface Water Quality Monitoring Program	A.1.a
MDEQ-WQAB	Development of IBI for Wadeable Streams	A.1.b
MDEQ-WQAB	Monitoring and Assessment of 303(d) Evaluated Wadeable Streams and Rivers in Yazoo River Basin	A.1.c
MDEQ-WQAB	Waste Load Allocation Studies	A.1.d
MDEQ-TMDL	Yazoo River Basin Clean Metals Monitoring	A.2.d
MDWFP	Survey of Channel Catfish Populations in MS	A.9.b
USDA ARS-NSL	MS Evaluations Systems Areas/MSEA	A.12.a
USDA ARS-NSL	Chemical, Physical, Biological, and Habitat Monitoring	A.12.b

Issue #15: Pathogens

Pathogens are bacteria that may cause illness in humans. Pathogens occur in human and animal wastes and pose a threat to humans primarily through skin contact or ingestion. Fecal coliform is a bacterium that is used in the monitoring process to indicate the potential for exposure to pathogens.

The 1998 303(d) List identified 16 streams or stream segments that were considered to be impaired due to pathogens. Potential sources for this impairment are often attributed to wildlife, livestock production, and waste water discharge from unsewered communities and failing septic systems.

Table 2
Monitored Water Bodies Impaired by Pathogens

Designated Use: Secondary Contact Recreation

Water Body	Support	Miles
Abiaca Creek	Not Supporting	32
Big Sunflower River	Partially-Not Supporting	20
Black Creek	Not Supporting	34
Coila Creek	Not Supporting	5
Coldwater River	Partially Supporting	15
Deer Creek	Not Supporting	17
Fannegusha Creek	Not Supporting	28
Hickahala Creek	Partially-Not Supporting	23
James Wolf Creek	Not Supporting	13
Little Tallahatchie River	Not Supporting	8
Otoucalofa Creek	Partially-Not Supporting	30

Senatobia Creek	Not Supporting	18
Tallahatchie River	Partially Supporting	21
Town Creek	Not Supporting	3
Yalobusha River	Not Supporting	2
Yazoo River	Not Supporting	27

Eight databases have been identified that can be used for assessment of this issue. These databases are listed below and included in Appendix B. More information about each database is provided in Appendix A.

Agency-Office-Program	Data Collection Activities/Databases That Can Be Used for Assessment of Issue #15	Appendix Number
MDEQ-WQAB	Ambient Surface Water Quality Monitoring Program	A.1.a
MDEQ-WQAB	Waste Load Allocation Studies	A.1.d
MDEQ-TMDL	Fecal Coliform 303(d) Monitoring and Assessment in Yazoo River Basin	A.2.a
MDEQ-TMDL	Fecal Coliform Monitoring for the Big Sunflower River Near Clarksdale	A.2.b
MDEQ-TMDL	GPS Siting of Onsite Wastewater Dischargers in Selected Watersheds	A.2.e
MDEQ-TMDL	Low-Level Infrared Aerial Photography in Selected Watersheds	A.2.f
USDA ARS-NS	Chemical, Physical, Biological, and Habitat Monitoring	A.12.b
USGS	Stream Gauge Monitoring	A.14.a

Issue #16: Discharges From Gravel Mines

Discharges from gravel mines are a problem at many locations throughout the basin due to the absence of adequate management practices that could reduce the discharge of sediment into adjacent streams. This issue is a component of Issue #8 (Effects of Agricultural Drainage On Public Lands) because of the impacts of gravel mine drainage into adjacent streams that enter nearby public lands. Additionally, this issue could become a component of other related issues (e.g., turbidity and suspended sediments in streams and oxbow lakes, habitat loss, et al), if gravel mines are found to contribute to the impacts that the issues address.

A spatial database is needed that identifies the locations of gravel mines in the Yazoo River Basin as well as information such as volumes of material mined and management practices employed at each site. Additionally, water quality information upstream and downstream from mining sites could indicate the impact that a site has on the adjacent water body.

Issue #17: Changing Low Flow Impacts on Waste Load Allocations

Waste load allocations are performed as a component of the permitting process by MDEQ. Information is collected and assimilated for use in a model that determines loading capabilities and limitations of receiving streams for facilities with waste water discharge permits. This issue addresses the impact that changing low flows have on the waste load allocations determined for regulated facilities that discharge into state waters.

One database has been identified that can be used for assessment of this issue. This database is listed below and included in Appendix B. More information about this database is provided in Appendix A.

Agency-Office-Program	Data Collection Activities/Databases That Can Be Used for Assessment of Issue #17	Appendix Number
MDEQ-WQAB	Waste Load Allocation Studies	A.1.d

Issue #18: Improperly Abandoned Water Wells

A major state-wide and basin-wide challenge is the existence of improperly abandoned water wells. Because these wells essentially serve as direct conduits to underlying unconfined and confined aquifers that serve as the primary drinking water sources in the state, the potential impact of this issue has both environmental and human health components. The large number of irrigation wells in the Delta ecoregion significantly broadens the scale of this issue. Currently, the only known information about the locations of these wells is maintained by YMD and MDEQ (OLWR and OPC Source Water Assessment Program); however, the accuracy and completeness of the information is not known.

In the Delta ecoregion, all public water supply wells are screened in deep confined aquifers, a situation that limits the risk to the vast majority of the population. However, shallow home wells used for drinking water purposes are vulnerable to contamination from adjacent improperly abandoned water wells. In the Bluff Hills ecoregion, public water supply wells are screened in both deep confined aquifers and shallow unconfined aquifers. In certain cases, water supply contamination has been documented in several public water supply wells (e.g., City of Oxford and University of Mississippi).

Identification of improperly abandoned water wells is needed throughout the Yazoo River Basin. Additionally, a spatial database is needed that identifies the locations of these wells.

Issue #19: High Chlorides at Tinsley Oil Field

Tinsley Oil Field in Yazoo County, discovered over five decades ago, was one of the first oil fields discovered in the state. A by-product of produced oil is salt water that in the past was stored in containment pits on the surface of the ground. Over time, the salt water impacted the ground water and surface water at some of the sites. The MDEQ Field Services Division has monitored this issue for a number of years and houses the water quality information.

Two databases have been identified that can be used for assessment of this issue. These databases are listed below and included in Appendix B. More information about each database is provided in Appendix A.

Agency-Office-Program	Data Collection Activities/Databases That Can Be Used for Assessment of Issue #19	Appendix Number
MDEQ-WQAB	Development of IBI for Wadeable Streams	A.1.b
MDEQ-WQAB	Monitoring and Assessment of 303(d) Evaluated Wadeable Streams and Rivers in Yazoo River Basin	A.1.c
MDEQ-FSD	*Data collection activity/database?*	

Issue #20: Discharges From Catfish Ponds

Hundreds of catfish ponds exist in the Yazoo River Basin. Once or twice each year these ponds are drained. Sometimes during heavy rainfall events, these ponds may discharge or have to be lowered. More information needs to be known on the effects of these discharges on water quality, such as the solids and nutrient characteristics of the discharges.

Dr. Craig Tucker with Mississippi State University has studied this issue and the State of Alabama has developed information on this issue. These sources of information should be contacted for their information and knowledge of the issue.

Issue #21: Irrigation Return Flows

Irrigation return flow and irrigation runoff need to be assessed for nutrient and chemical loading before leaving an agricultural field to provide information on the impact of receiving water bodies. Since rice and other irrigation return flows contribute to the base flows of a number of basin streams during the summer, base-line information is needed to determine that this issue is a contributor to surface water pollution or if it is only a perceived problem. If information does not currently exist that addresses this issue, then water quality data needs to be collected to assess this issue. No data has been identified that can be used for assessment of this issue.

Issue #22: Stream Bank Erosion

Stream bank erosion is a natural process that sometimes becomes accelerated through activities of man. Because this issue must be considered when considering other related issues (e.g., turbidity and suspended sediments in streams and oxbow lakes, habitat loss, et al), it will not be addressed as a separate issue for information collection purposes.

Eight databases have been identified that can be used for assessment of this issue. These databases are listed below and included in Appendix B. More information about each database is provided in Appendix A.

Agency-Office-Program	Data Collection Activities/Databases That Can Be Used for Assessment of Issue #22	Appendix Number
MDEQ-WQAB	Ambient Surface Water Monitoring Program	A.1.a
MDEQ-WQAB	Development of IBI for Wadeable Streams	A.1.b
MDEQ-WQAB	Monitoring and Assessment of 303(d) Evaluated Wadeable Streams and Rivers in Yazoo River Basin	A.1.c
MDEQ-WQAB	Nutrient Criteria Development for Streams/Rivers and Lakes	A.1.e
USACE-WES-FS	Monitoring to Assess Impact of Flood Control Projects, Restoration of Aquatic Habitats, and Low-Flow Studies	A.11.a
USDA ARS-NSL	Chemical, Physical, Biological, and Habitat Monitoring	A.12.b
USGS	Stream Gauge Monitoring	A.14.a
USGS	National Water Quality Assessment Project	A.14.c

C. Lower Priority Issues

Although a number of issues identified by resource agencies and basin stakeholders have been determined to have a lower priority than those discussed in the previous two sections of this report, they are important issues. Resource constraints could limit the collection of new monitoring information for these issues at this time; however, it is hoped that the Compendium of Water Quality Information in the Yazoo River Basin will identify additional existing information that can be used to address the impacts of these issues.

Issue #23: Monitoring of Indian Bayou

During a public stakeholders meeting in Indianola, Mississippi, a request was made to collect water quality data from Indian Bayou. Consideration will be given to this request when MDEQ's ambient monitoring program is re-established, subject to the priorities of other basin issues. Self-monitoring through MDEQ's Adopt-A-Stream Program is a near-term option. For information on this program, contact Anne Marie Moorman (601-961-5394 or Anne_Moorman@deq.state.ms.us).

Issue #24: Dioxin in the Tennessee/Kentucky Clay Mine

Several years ago, dioxin was found to be present in clay used as a binding agent for commercial fish food. Because of the potential human and environmental health concerns, extensive monitoring was performed to assess the source and cause of the occurrence of the dioxin. This information and an accompanying report can be accessed by contacting Henry Folmar, MDEQ Lab Director (601-3910 or Henry_Folmar@deq.state.ms.us).

Issue #25: Point Sources Discharging Into the Main Canal

MDEQ's enSite and enSearch databases have lists of regulated facilities that discharge into the Main Canal. However, facilities are only listed if they have a permit, have had a permit in the past, or have applied for a permit for a new facility. In addition, low-level infrared aerial photography in selected watersheds (Appendix B.2.f) contracted through TVA can provide information on the locations of some point sources discharging into the water body. For more information, contact Richard_Ingram (601-961-5078 or Richard_Ingram@deq.state.ms.us).

Issue #26: Hog Farms in Webster and Chickasaw Counties

Issues related to hog farms have been both controversial and highly visible in the recent past. Individual facility requirements are contained in each individual permit. A general permit requirement is for facilities to sample stormwater runoff from their fields. Several years ago, MDEQ conducted a study of the water quality of the receiving streams below selected farms.

MDEQ's enSite and enSearch databases have lists of existing facilities in Webster and Chickawaw Counties. However, facilities are only listed if they have a permit, have had a permit in the past, or have applied for a permit for a new facility. Other than locational information, they are "No Discharge" facilities and do not have outfall information. For more information, contact Bryan Collins (601-961-5239 or Bryan_Collins@deq.state.ms.us).

Issue #27: Floodplain Areas in Denmark, MS Area

During a public stakeholders meeting in Oxford, Mississippi, a concern was raised about an impact to the water quality of a privately-owned lake created by a state road project. When Highway 6 East (south of Denmark Road) was constructed, natural flow to an adjacent stream was impacted. As a result, a pond is now being filled by sediment from the constructed area and the fish population is being eliminated. Additionally, an artificial wetland area is now being created.

Self-monitoring of this privately-owned pond through MDEQ's Adopt-A-Stream Program is a near-term monitoring option. For information on this program, contact Anne Marie Moorman (601-961-5394 or Anne_Moorman@deq.state.ms.us).

Issue #28: Urea spills from barges could cause temporary exceedances of water quality standards – could EPA use this as an opportunity to shut down operation? The concern is that EPA might shut down an operation and adversely impact the local economy at Greenville.

EPA Region IV has been asked to comment on this issue.

Issue #29: Concern over regulation of stormwater and impact of Phase II regulations. Will towns have to establish controls for runoff from gasoline stations and other urban facilities? It is very difficult to accurately size stormwater impoundments.

Phase II Storm Water Regulations do not specifically require a city or town to establish specific controls for gasoline stations or other urban facilities, nor does it specifically require storm water impoundments. Mississippi's Phase II Storm Water Permit will require regulated entities to develop, implement and enforce a Storm Water Management Program (SWMP) to reduce the discharge of pollutants and protect water quality. In developing a SWMP, the permit will require cities or towns to choose appropriate Best Management Practices (BMPs) that address the following six minimum control measures:

- Public education and outreach on storm water impacts
- Public involvement and participation
- Illicit connection and discharge detection and elimination
- Construction site runoff control
- Post-construction storm water management in development and redevelopment
- Pollution prevention and good housekeeping of municipal operations

For more information, contact Kenneth LaFleur or Jim Morris (601-961-5171 or Kenneth_LaFleur@deq.state.ms.us) or go to MDEQ's web site (http://www.deq.state.ms.us/newweb/homepages.nsf) to the General Permits Branch under the Environmental Permits Division for detailed guidance on Phase II Storm Water Program permitting requirements.–

Issue #30: Leaking Underground and Above Ground Storage Tanks

Statewide, there are approximately 450 underground storage tanks (USTs) in assessment or remediation because of suspected releases of gasoline or diesel fuel.

Of these 450, 178 have been shown to have adversely impacted soil and groundwater in their vicinity. There are no registration requirements for USTs under 110 gallons, non-commercial USTs under 1100 gallons, those containing hazardous waste, and above ground storage tanks (ASTs). However, ASTs are required to have a spill prevention control and countermeasure (SPCC) plan, but they are not required to conduct tank tightness or monitoring tests. Water quality impacts have been discovered in other parts of the state due to leaking tanks. Existing data sources are the UST database at MDEQ and in the files of the APCC plans. EPA also has information on ASTs. Monitoring and sampling near the tanks to check for contamination is not required, although seventy percent of the leakage from ASTs is from underground pipes and fittings.

Issue #31: Atmospheric Deposition of Urban Pesticides

In April 1995, the U.S. Geological Survey began a 24-week study to determine the occurrence and temporal distribution of 49 pesticides and pesticide metabolites in air and rain samples from an urban and agricultural sampling station in Mississippi. Every weekly rain and air sample collected from both the urban and agricultural sites had detectable levels of multiple pesticides. The magnitude of the total concentration was 5 to 10 times higher at the agricultural site as compared to the urban site. The pesticide with the highest concentration in rain at both sites was methyl parathion, although methyl parathion is not registered for urban use. The pesticide with the highest concentration in the air samples from the agricultural site was also methyl parathion, but from the urban site the highest concentrations was diazinon followed closely by chlorpyrifos. A metabolite of p,p'-DDT, p,p' DDE, was detected in every sample from the agricultural site and in more than half of the air samples from the urban site more than two decades since DDT was banned from use in the United States.

R. H. Coupe, M.A. Manning, W.T. Foreman,, D.A. Goolsby, and M.S. Majewski. 1999 have co-authored a report on the "Occurrence of Pesticides in Rain and Air in Urban and Agricultural Areas of Mississippi, April-September 1995" that was published in the "Proceedings of the U.S. Geological Survey Toxic Substances Hydrology Program Technical Meeting, Charleston, South Carolina, March 8-12, 1999." The data supporting the report indicate the possibility of long distance atmospheric transport of pesticides, which could possibly have an effect on basin planning and assessment. Human heath effects of these concentrations of pesticide have not been established. The report can also be found as "Water-Resources Investigation Report 99-4018B" available through USGS and more information about the report can be found in Appendix A.14.c.

Replication of this effort is desirable, in addition a larger scale network of sampling stations might be useful in order to assess the spatial extent and perhaps patterns of materials in the atmosphere. Also, basic research on transport mechanisms, human health effects and ecosystem effects could all be addressed.

Issue #32: Determining Cumulative Impacts of Best Management Practices (BMPs) Implemented Through State and Federal Water Quality Management Plans

The economic impact of programs to improve water quality should be considered as part of each plan. Costs should also reflect any additional resources needed by federal, state, tribes, and local governments to meet the needs of their customers in complying with the requirements of the Cean Water Act. This could include costs of making upgrades at NPDES sites and costs of changes in land use practices for nonpoint discharges. It would also be desirable to include the enhanced prospects for expanded economic development associated with a stream having a plan to meet TMDL goals, or even better, not being listed on the 303d List of Impaired Waters. Executive Order 12866 requires that costs and direct impacts on farmers, ranchers and small wooded lot owners be evaluated.

Some information on costs and environmental benefits of water quality improvement practices is available. The information needs to be organized and applied to any water quality management plan to be developed. Including an analysis of economic costs and benefits will help to assure that the entire program will be practical and financially successful.

Agency-Office-Program	Data Collection Activities/Databases That Can Be Used for Assessment of Issue #32	Appendix Number
MDEQ-WQAB	Ambient Surface Water Quality Monitoring Program	A.1.a
MDEQ-WQAB	Development of IBI for Wadeable Streams	A.1.b
MDEQ-WQAB	Monitoring and Assessment of 303(d) Evaluated Wadeable Streams and Rivers in Yazoo River Basin	A.1.c
MDEQ-WQAB	Nutrient Criteria Development for Streams/Rivers and Lakes	A.1.e
USDA ARS-NSL	MS Evaluations Systems Areas/MSEA	A.12.a
USDA ARS-NSL	Chemical, Physical, Biological, and Habitat Monitoring	A.12.b
USGS	Stream Gauge Monitoring	A.14.a
USGS	MS Delta Management Systems Evaluation Areas Project Monitoring	A.14.b

Issue #33: City of Greenville – Elevated Total Dissolved Solids

Drinking water for Greenville, Mississippi comes from the Cockfield aquifer. Just south of Greenville, salinity levels in the aquifer are higher than those levels generally acceptable for a public drinking water supply. There is some concern that these salinity levels may increase over time.

Several years ago, the USGS and the Office of Land and Water Resources recognized this potential problem. In 1991 OLWR initiated an ongoing groundwater monitoring program. In addition to the required water quality reporting of public water systems, a network of private and public wells in the Greenville area are sampled one to two times each year; and these samples analyzed for salinity level. To date, data do not indicate that salinity levels are increasing in Greenville wells. This is a naturally occurring condition within the Cockfield aquifer in this area that has long been recognized.

The ongoing monitoring program should definitely be continued. Because older home wells are being destroyed or abandoned, there is a need for the construction of new observation or monitoring wells in this area to not only continue the sampling program, but to also help better define the area involved. The Office of Land and Water Resources and YMD are cooperating on an annual sampling program. To date OLWR has been conducting analyses for chloride concentrations obtained from the sampling program.

D. Required EPA-Delegated Issues

Through primacy agreements, EPA has delegated a number of monitoring, assessment, and reporting activities to the Mississippi Department of Environmental Quality. Within the agreements, EPA specifies data collection and assessment requirements for each activity that must be met in order for the State to maintain the program. The activities are described below.

Issue: 305(b) Water Quality Assessment Report Monitoring

Mississippi's biennial Water Quality Assessment Report is prepared by MDEQ pursuant to Section 305(b) of the federal Clean Water Act. The purpose of the 305(b) Report is to describe for EPA, Congress, and the public the status of the quality of the state's waters. The major focus of the report is to determine if the designated uses of the state's surface water bodies are supported. Along with water quality information, the report lists the causes and sources of pollution for those waters determined to be impaired, identifies and discusses water pollution control programs for point and nonpoint sources of pollution, documents environmental improvements for the previous two years, notes special water quality concerns and problems, and describes the State's water quality monitoring program. The report also includes recommendations for needed studies, programs, and funding to adequately manage Mississippi's water quality resources.

For water quality assessment purposes, all readily available water quality information that meets EPA monitoring and assessment standards can be used in watershed assessments. The information is compiled and then categorized as one of two types of assessments, evaluated or monitored, based on the quality and quantity of the data available. These two types of assessments are necessary to provide a comprehensive

assessment and understanding of water quality conditions and trends within an entire watershed.

Evaluated assessments focus on stream reaches where no current site specific monitoring data is available. These assessments take into consideration land use activities, surveys and questionnaires from other agencies, locations of potential pollution sources, volunteer monitoring data, limited monitoring data of lower confidence, monitoring data greater than five years old, and data that has been extrapolated from an adjacent monitored stream reach.-

Monitored assessments focus on stream reaches where current site specific monitoring data is available. Current data is defined as data collected within five years of the assessment analysis. These assessments are based on one or more different types of monitoring data that have been grouped together by water body and then are analyzed collectively in order to determine water quality status or condition for the water body. Monitoring data can come in many different forms but primarily consist of one or more of the following data types: physical/chemical, biological, habitat, bacteriological, and/or toxicological.

MDEQ and other state, federal and local agencies have programs that routinely monitor the conditions of surface and ground waters to determine their quality and quantity relative to human health considerations, ecological conditions, and designated water uses. MDEQ also uses this data to assess the quality of the water body by comparing observed measurements to the State's water quality standards for the water's designated uses.-

Common methods used by MDEQ to monitor water quality include fixed network routine ambient monitoring for long-term status and trends, as well as targeted basin monitoring to address specific data needs. Both of these monitoring methods are used to obtain water quality data on physical, chemical, bacteriological and biological indicators.

Ten databases have been identified that will be used for the 305(b) Water Quality Assessment Report. These databases are listed below and included in Appendix B. More information about each database is provided in Appendix A.

Agency-Office-Program	**Data Collection Activities/Databases To Be Used for 305(b) Water Quality Assessment Report**	**Appendix Number**
MDEQ-WQAB	Ambient Surface Water Quality Monitoring Program	A.1.a
MDEQ-WQAB	Development of IBI for Non-Delta Wadeable Streams	A.1.b
MDEQ-WQAB	Monitoring and Assessment of 303(d) Evaluated Wadeable Streams and Rivers in Delta Ecoregion	A.1.c
MDEQ-WQAB	Waste Load Allocation Studies	A.1.d
MDEQ-WQAB	Big Sunflower River Monitoring Project	A.1.e
MDEQ-WQAB	Nutrient Criteria Development for Streams/Rivers and Lakes	A.1.f

MDEQ-WQAB	Fecal Coliform 303(d) Monitoring and Assessment in Yazoo River Basin	A.1.g
MDEQ-WQAB	Fecal Coliform Monitoring for the Big Sunflower River Near Clarksdale	A.1.h
MDEQ-WQAB	Yazoo River Basin Wet Weather Monitoring	A.1.i
MDEQ-WQAB	Yazoo River Basin Metals Monitoring	A.1.j

Issue: Development of Total Maximum Daily Loads (TMDLs) on Impaired Monitored Water Bodies

Total maximum daily loads (TMDLs), as defined by EPA, are written plans and analyses established to ensure that the water body will attain and maintain water quality standards, including consideration of reasonably foreseeable increases in pollutant loads. The TMDL should establish pollutant level reductions that will cause the impaired use to be fully supported. TMDLs are required to be developed for all impaired water bodies. Mississippi's 1998 303(d) List of Impaired Water Bodies identifies all of the water bodies within the state that are considered to be impaired. Sources of data for this list include monitored and evaluated assessments from various water quality programs.

Within the Yazoo River Basin, impairment has been established in 55 monitored water body segments. Eighty-five TMDLs are planned for those water bodies to the identified causes of impairment (each water body segment can have more than one cause of impairment).

Cause	Number	Percentage
Pathogens	29	34
PH	19	22
Organic Enrichment/Low Dissolved Oxygen	9	11
Biological Impairment	8	9
Nutrients	6	7
Others	14	17
Total	85	100

Fourteen databases have been identified that will be used for developing Total Maximum Daily Loads. These databases are listed below and included in Appendix B. More information about each database is provided in Appendix A.

Agency-Office-Program	Data Collection Activities/Databases To Be Used for TMDL Development	Appendix Number
MDEQ-WQAB	Ambient Surface Water Quality Monitoring Program	A.1.a
MDEQ-WQAB	Development of IBI for Non-Delta Wadeable Streams	A.1.b
MDEQ-WQAB	Monitoring and Assessment of 303(d) Evaluated Wadeable Streams and Rivers in Delta Ecoregion	A.1.c
MDEQ-WQAB	Waste Load Allocation Studies	A.1.d
MDEQ-WQAB	Big Sunflower River Monitoring Project	A.1.e

MDEQ-WQAB	Nutrient Criteria Development for Streams/Rivers and Lakes	A.1.f
MDEQ-WQAB	Fecal Coliform 303(d) Monitoring and Assessment in Yazoo River Basin	A.1.g
MDEQ-WQAB	Fecal Coliform Monitoring for the Big Sunflower River Near Clarksdale	A.1.h
MDEQ-WQAB	Yazoo River Basin Wet Weather Monitoring	A.1.i
MDEQ-WQAB	Yazoo River Basin Metals Monitoring	A.1.j
MDEQ-WQAB	GPS Siting of Onsite Wastewater Dischargers in Selected Watersheds	A.1.k
MDEQ-WQAB	GPS Siting of NPDES Dischargers	A.1.l
MDEQ-WQAB	GPS Siting of Large Quantity Agricultural Chemical Storage and Mixing Sites	A.1.m
MDEQ-WQAB	Low-Level Infrared Aerial Photography in Selected Watersheds	A.1.n

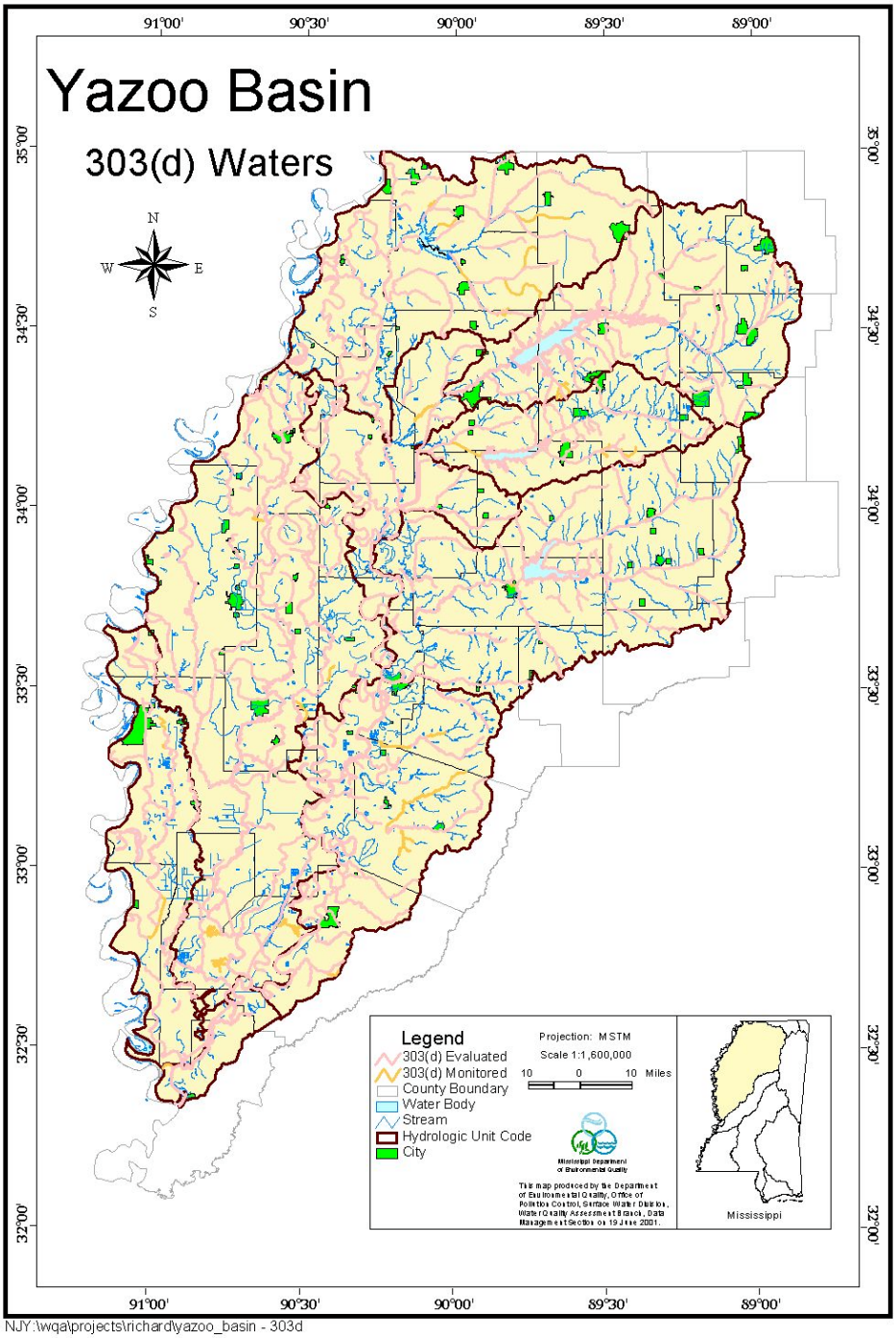
Issue: Determining Condition of Section 303(d) Evaluated Waters

Section 303(d) Evaluated Waters are those waters listed as "evaluated" on the State's Section 303(d) List of Impaired Waters that is prepared pursuant to Section 303(d) of the Clean Water Act. Evaluated waters are those waters for which no monitoring data exists that can be used to determined whether or not the water body is impaired. Generally, evaluated waters are drainage areas thought to be potentially impacted as defined by the State's Nonpoint Source Assessment Document of 1989 and 1998. The potential causes of impairment are those pollutants associated with agricultural, silvicultural, and other land use practices (e.g., sediment, nutrients, bacteria, pesticides, and organic enrichment). MDEQ is committed to collect the data necessary to determine the condition of the 303(d) evaluated waters. Based upon this data, a determination can then made whether these water bodies are actually impaired.

To accomplish this task in the Delta Ecoregion, a Water Quality Assessment Work Group was established from the Yazoo River Basin Team. The work group was charged with the task of developing a methodology to assess the evaluated waters. The work group will use both macroinvertebrate and fish species data. A conceptual monitoring plan has been developed, and will be assessed through a pilot project of limited scale. The US Corps of Engineers' Engineer Research and Development Center (ERDC) has been contracted to conduct the fish species data collection component and the US Geological Survey has been contracted to perform the macroinvertebrate data collection component. Once the pilot project is completed and the methodology assessed, a Delta-wide study will ensue. The statewide Index of Biological Integrity (IBI) project will be used to determine the condition of Section 303(d) evaluated waters in the non-Delta portion of the basin.

Including those already identified, a total of three databases will be used to determine the condition of 303(d) evaluated waters in the basin. These databases are listed below and included in Appendix B. More information about each database is provided in Appendix A.

Agency-Office-Program	Data Collection Activities/Databases To Determine Condition of 303(d) Evaluated Waters	Appendix Number
MDEQ-WQAB	Development of IBI for Non-Delta Wadeable Streams	A.1.b
MDEQ-WQAB	Monitoring and Assessment of 303(d) Evaluated Wadeable Streams and Rivers in Delta Ecoregion	A.1.c
MDEQ-WQAB	Nutrient Criteria Development for Streams/Rivers and Lakes	A.1.f



Issue: Determining Cause of Impairment for Selected Streams

The 1998 Section 303(d) List of Impaired Waters catalogs water bodies for which current monitoring data indicate impairment of designated use and violations of water quality standards. The cause(s) of impairment as well as the designated use of the water body are provided on the list. In some cases, pollutant-specific data indicate that specific water quality standards were violated. However, for some water bodies the primary monitoring data available (e.g., biological assessments) indicate that the health of the aquatic community has been impacted relative to a reference site. Because the biological assessment does not provide direct information on the specific chemical pollutant causing the impairment, biological impairment is listed as the cause in those cases. When these situations occur, additional monitoring is required to determine the specific causes of the impairment to that a Total Maximum daily load (TMDL) can be established.

In order to verify impairment, a biological assessment will be performed on the receiving stream. Physical and chemical water quality parameters will also be sampled as will water column metals in an attempt to determine the cause((s) of the biological impairment. Both point and nonpoint pollution sources will be inventoried, and the effluents of point sources, if present, will be sampled for the same suite of physical and chemical water quality parameters that were sampled during previous studies. To assess the potential impact from nonpoint sources of pollution, land use activities will be characterized through aerial photography and/or ground surveys.

Issue: Waste Load Allocation Studies on Selected Streams

Mathematical computer models are used to develop waste load allocations (WLAs) for wastewater discharges by predicting water quality impacts of pollutants from these sources on the State's freshwater and estuarine water bodies. The MDEQ water quality-based effluent limitation (WQBEL) process sets forth the conditions for which these mathematical models are used. A cost-effective method for documenting the actual in-stream effect of an existing or potential point source discharge is the comparison of available biological and physical/chemical monitoring data upstream of the existing discharge or prior to effluent release with data collected downstream or after initiation of the discharge. Such studies provide valuable in-stream water quality information needed for WLA decision-making purposes.

The combined use of modeled WLA determination and in-stream monitoring data ensures that in-stream water quality standards are protected, as well as the biological community. This approach also lessens the incidence of unfair penalties to NPDES permittees that could occur based on incorrect modeling assumptions.

NPDES facilities are targeted for WLA studies based upon preliminary investigations that incorporate such factors as the potential issuance of stringent effluent limits,

permit reissuances with significant increases in discharger flow, new discharges to sensitive waters, and facilities consistently found to be noncompliant with their established permit limits. The actual WLA studies involve biological data collection to assess the in-stream benthic macroinvertebrate community, stream flow measurements, land use surveys, and the limited collection of physical/chemical monitoring data in the stream and effluent. Multi parameter dataloggers are also used in-stream to monitor dissolved oxygen, temperature, pH, and specific conductance/salinity/total dissolved solids. This is usually done at hourly intervals over a 24-48 hour period to determine diurnal fluctuations in these parameters. Chemical sampling of the effluent and at in-stream locations generally involves conventional water quality parameters such as biochemical oxygen demand, nutrients, solids, and turbidity.